

LETTER TO THE EDITOR

Post-TAVI ECG change: What's the mechanism?

1 | CASE PRESENTATION

An 80-year-old male was electively admitted to the hospital for a scheduled transcatheter aortic valve (CoreValve™ Evolut™ R, Medtronic, MN, USA) implantation (TAVI) due to severe aortic stenosis. The surface 12-lead electrocardiogram (ECG) showed sinus rhythm with left axis deviation, PR interval of 209 ms, and right bundle branch block (RBBB) (Figure 1, top). Despite successful valve implantation, the patient developed complete heart block (CHB) during the procedure. A temporary-permanent pacemaker was inserted. On the first day of admission post-TAVI, the ECG showed sinus rhythm with a prolonged PR interval of 261 ms and narrow QRS morphology, with no RBBB (Figure 1, bottom). The ECG still showed narrow QRS morphology on his second day of admission. The patient

underwent a single-chamber leadless pacemaker implantation due to the age, preexisting RBBB, and intermittent CHB. How can we explain the sudden ECG change?

2 | DISCUSSION

The surface ECG in Figure 1 top shows a PR interval of 210 ms and RBBB, and the post-TAVI ECG in Figure 1 bottom shows a prolonged PR interval of 270 ms and a normalized QRS width. The normalization of the width of the QRS complexes as well as the variations in the PR intervals in patients with bundle branch block can be explained by a mechanism called "equal delay in both branches," also known as "pseudo-supernormal conduction" (Baranchuk, Miranda,

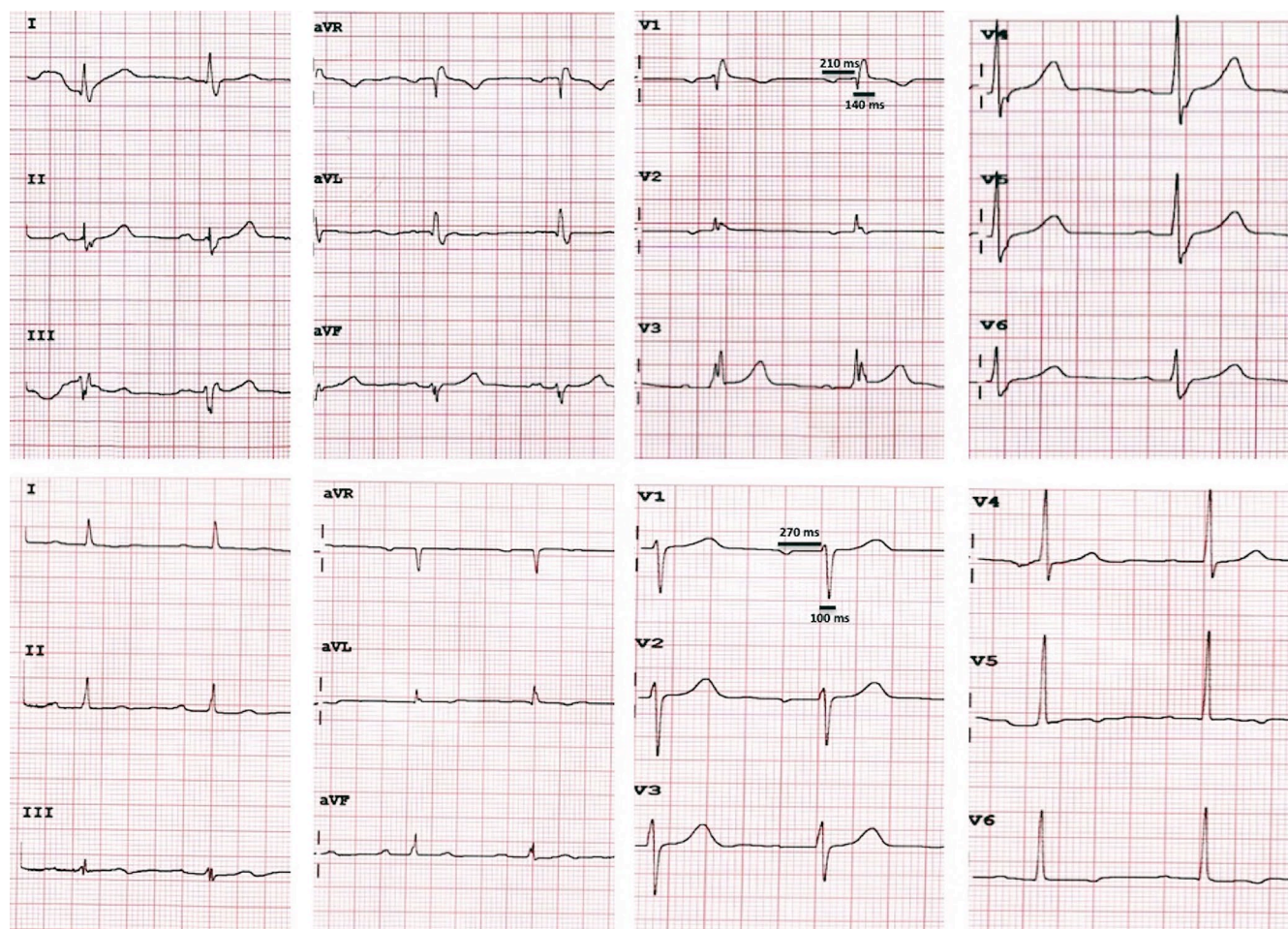


FIGURE 1 Top: Pre-TAVI 12-lead ECG showing RBBB + LAFB + 1°AV block. Bottom: Post-TAVI 12-lead ECG showing further prolongation of the PR interval with normalization of the QRS duration

Rana, & Michael, 2012; Josephson, 2008). The prolonged PR interval can be the consequence of both bundles reaching their refractory periods simultaneously, and the normalization of the QRS width occurs due to equal delay, which occurs simultaneously in both branches. The patient had RBBB and left anterior fascicular block prior to the TAVI procedure. The TAVI could cause further delay in the left posterior fascicle, or more likely in the proximal left bundle branch, which could lead to equal delay in both the right and the left bundle branch, causing the QRS to normalize its duration. This may happen as the result of the pressure applied by the implanted valve.

Patients with preexisting RBBB have demonstrated an increased risk of cardiovascular mortality following TAVI, and patients with RBBB and without pacemakers were shown to be at a higher risk of death early after discharge (Watanabe et al., 2016).

In this case, due to the increased risk of cardiovascular mortality in patients with preexistent RBBB, existence of pseudo-supernormal conduction, and intermittent CHB, the patient underwent permanent pacemaker implantation.

CONFLICT OF INTEREST AND DISCLOSURE OF FUNDING

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ORCID

Enes E. Gul  <https://orcid.org/0000-0003-1285-0638>


Sohaib Haseeb  <https://orcid.org/0000-0003-2799-5135>

Adrian Baranchuk  <https://orcid.org/0000-0002-3042-6569>

Enes E. Gul¹ 

Sohaib Haseeb² 

Reda Abuelatta¹

Adrian Baranchuk² 

¹*Division of Cardiac Electrophysiology, Madinah Cardiac Centre, Madinah, Saudi Arabia*

Email: elvin_salamov@yahoo.com

²*Division of Cardiology, Kingston Health Sciences Centre, Queen's University, Kingston, Ontario, Canada*

Correspondence

Enes E. Gul, MD, Consultant Cardiac Electrophysiologist, Division of Cardiac Electrophysiology, Madinah Cardiac Centre, Madinah, Saudi Arabia.

Email: elvin_salamov@yahoo.com

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